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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,708	12/03/2003	Paul Koning	42P17610	8622
59796 7590 03/20/2007 INTEL CORPORATION c/o INTELLEVATE, LLC P.O. BOX 52050 MINNEAPOLIS, MN 55402			EXAMINER LAMBELET, LAWRENCE EMILE	
			ART UNIT	PAPER NUMBER
			1732	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/20/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

# Office Action Summary

Application No.

10/727,708

Applicant(s)

KONING ET AL.

Examiner

Lawrence Lambelet

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's amendment filed on 6/22/2006 is acknowledged. Cancelled claims 11-15, amended claims 1 and 7, and new claim 16 are placed of record in the file. Claims 1-10 and 16 are pending.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davison (U.S. Patent Application Publication 2004/0266064), and further in view of Hanson et al (U.S. 6,962,670).

Davison discloses a method of imprinting a trench on a substrate, as recited by claim 1. Davison teaches applying a dielectric layer over a base layer (substrate) having conductive elements and imprinting with a tool to form a trench. See paragraphs [0024], [0025], [0032], and [0033]. The imprint goes through the dielectric layer to make contact with the conductive element below, as shown in Fig. 4E.

Davison does not teach adding a fluorescent material to the dielectric layer therewith to detect material at the bottom of the trench by observing radiation in a visible

light range respondent to UV irradiation, as required by claims 1, 4, and 5. Davison further does not teach the fluorescent material less than 2%, as required by claims 2 and 3. Davison still further does not teach the determination of a failure mode, as required by claim 6.

Hanson et al, hereafter "Hanson", teaches a method of detecting the thickness of a layer of material by adding a concentration of fluorophores to the layer and measuring the visible light response to UV impingement. This is shown at lines 15-22 in column 3, and lines 4-27, 28-31, 38-43, and 59-67 in column 4. Hanson teaches that the detected fluorescence is a predictable function of thickness at lines 55-67 in column 13 and lines 1-9 in column 14. The detection of radiation from the bottom of the trench would have been obvious to one skilled in the art because the thickness of the layer at the bottom is reduced or negligible. Since the method measures magnitude (intensity) of the fluorescing signal, the comparison of the measurement to a threshold value provides a means for determination of failure.

Hanson teaches an addition level of fluoropore material at 100 ppm (0.01%). This is shown at lines 55-61 in column 11.

Davison and Hanson are combinable because they are concerned with a similar technical field, namely, non-uniformity of layer thicknesses in laminate structures. It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Davison the technique of detecting critical presence of material by measuring thickness, as taught by Hanson. Davison teaches that a process of etching is required to remove excess dielectric material that may remain in the bottom of

the trench in paragraph [0042]. The motivation to combine, therefore, would be the elimination of a non-productive etching step where sufficient removal can be validated by detection means.

Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koning et al (U.S. Patent Application Publication 2005/0116299), and further in view of Hanson.

Koning et al, hereafter "Koning", discloses a method of imprinting a dielectric layer with a tool, as recited in claim 7. Koning teaches pressing a male-patterned tool foil into a softened dielectric substrate in paragraph [0029]. Koning further teaches that the softened dielectric material sometimes sticks on the surface of the tool creating a need to remove contaminant (maintaining). See the same paragraph.

Koning does not teach adding a fluorescent material to the dielectric layer therewith to detect material stuck on the tool by observing radiation in a visible light range respondent to UV irradiation, as required by claims 7, 8, 9, and 10.

Hanson teaches a method of detecting the thickness of a layer of material by adding a concentration of fluorophores to the layer and measuring the visible light response to UV impingement. This is shown at lines 15-22 in column 3, and lines 4-27, 28-31, 38-43, and 59-67 in column 4. It would have been obvious to one of ordinary skill that this method provides a means for detecting the presence of contaminant on the tool.

Koning and Hanson are combinable because they are concerned with a similar technical field, namely, non-uniformity of layer thicknesses in laminate structures. It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Koning the technique of detecting critical presence of material by measuring thickness, as taught by Hanson. Koning teaches that contamination on the tool causes degradation of features and reduced yield while cleaning requires painstaking removal and re-alignment. See paragraph [0029]. The motivation to combine, therefore, would be the definitive determination of contaminant presence.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resnick et al (U.S. Patent Application Publication 2004/0224261), and further in view of Hanson et al.

Resnick et al, hereafter "Resnick", discloses a method of imprinting a trench, as recited by claims 1 and 7. Resnick teaches imprinting a patterning layer (dielectric) formed over a substrate layer (conductor) with a template (tool) to form a trench therethrough. See paragraphs [0012], [0013], and [0018] and claim 17 of the reference.

Resnick teaches further processing the patterning layer by wet or dry etches to remove excess material, as required by claim 16.

Resnick does not teach adding a fluorescent material to the dielectric in the patterning layer therewith to detect material at the bottom of the trench, or on the template, by observing radiation in a visible light range respondent to UV irradiation, as

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required by claims 1, 7, 4, 5, 8, 9 and 16. Resnick further does not teach the fluorescent material less than 2%, as required by claims 2 and 3. Resnick still further does not teach the determination of a failure mode, as required by claims 6 and 10.

Hanson et al, hereafter "Hanson", teaches a method of detecting the thickness of a layer of material by adding a concentration of fluorophores to the layer and measuring the visible light response to UV impingement. This is shown at lines 15-22 in column 3, and lines 4-27, 28-31, 38-43, and 59-67 in column 4. Hanson teaches that the detected fluorescence is a predictable function of thickness at lines 55-67 in column 13 and lines 1-9 in column 14. The detection of radiation from the bottom of the trench would have been obvious to one skilled in the art because the thickness of the layer at the bottom is reduced or negligible. Since the method measures magnitude (intensity) of the fluorescing signal, the comparison of the measurement to a threshold value provides a means for determination of failure.

Hanson teaches an addition level of fluoropore material at 100 ppm (0.01%). This is shown at lines 55-61 in column 11.

Resnick and Hanson are combinable because they are concerned with a similar technical field, namely, non-uniformity of layer thicknesses in laminate structures. It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the method of Resnick the technique of detecting critical presence of material by measuring thickness, as taught by Hanson. Resnick's template (tool) comprehends in the structure a certain thickness of material; hence, uniformity of thickness of the

layer would be critical to a successful imprint. The motivation to combine, therefore, is to make a determination of uniformity of the layer to be imprinted.

### ***Response to Arguments***

Applicant's arguments filed 12/19/2006 have been fully considered but they are not persuasive.

With regard to withdrawal of references under 35 U.S.C. §103 (c), it is not apparent from the information submitted by applicant that there was common assignment at the time the invention was made. The constructive date of the invention is 12/3/2003. It would appear that Davison was assigned 12/8/2003 and Koning '299, 11/4/2004. Both assignments post-date the invention. The rejections for claims 1-6 under 35 U.S.C. §103 (a) over Davison in view of Hanson and for claims 7-10 over Koning '299 in view of Hanson stand as previously drawn.

With regard to Resnick in view of Hanson, applicant argues that the references fail to disclose or suggest that the detected radiation is for the purpose of determining a successfully formed trench, as recited by amended claims 1 and 7. This recitation, however, is a statement of intended use. Language that does not require steps to be performed does not limit the scope of a claim or claim limitation and is, therefore, not given patentable weight. See MPEP ¶ 2106 (II C).

Applicant further argues, with respect to claims 1 and 7, that references are concerned with measuring the thickness of material whereas the claims are concerned with the absence of material. Examiner points out that negligible thickness, which is



measurable in the combined method of Resnick/Hanson, is, in fact, equivalent to the absence of material. It is well settled that a reference must be considered for not only what it expressly teaches, but also for what it fairly suggests and that the entirety of the reference disclosure, including unpreferred embodiments must be considered in determining obviousness. *In re Burckel* 592 F.2d 1175, 201 USPQ 67 (CCPA 1979; *In re Lamberti* 545 F.2d 192 USPQ 278 (CCPA 1976).

With regard to Hanson requiring a transparent material to fully assess thickness, the argument carries no weight in view of the teaching of a capability to detect virtually no material.

With regard to teaching motivation for combination, Hanson teaches that a method objective is the measuring of non-uniformity of thickness. See lines 57-61 in column 3. One of ordinary skill in the art, in possession of the teachings of Resnick, would be concerned about the evenness of the template imprint, and therefore the non-uniformity of the pattern layer. Motivation to combine prior art references may exist in the nature of the problem to be solved (*Ruiz v. A.B. Chance Co.*, 357 F. 3d 1276, 69 USPQ 2d 1690 (Fed. Cir. 2004)) or the knowledge of one of ordinary skill in the art (*National Steel Car v. Canadian Pacific Railway Ltd.*, 357 F. 3d 1319, 1338, 69 USPQ 2d 1641 (Fed. Cir. 2004)).

With regard to improper hindsight, "any judgment on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from

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applicant's disclosure, such a reconstruction is proper." *In re McLaughlin*, 443 F. 2d 1392, 1395 USPQ 209, 212 (CCPA 1971).

With regard to claims 6 and 10, applicant argues that Hanson fails to teach or suggest detecting an intensity of radiation in excess of a threshold intensity as a means of determining proper trench formation. In response, Hanson teaches that the fluorescent signal and layer thickness is calibratable. See lines 37-40 in column 5. The reference fairly suggests a means for determining material presence in a quantifiable way by radiation intensity. That the claimed purpose of such a determination is not expressly taught by Hanson does not compromise a prima facie case.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Lambelet whose telephone number is 571-272-1713. The examiner can normally be reached on 8 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LEL  
3/13/2007

  
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SUPERVISORY PATENT EXAMINER  
3/16/07